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WEEKLY STATION REPORTS

OF THE DIVISION OF

DRY LAND AGRICULTURE

BUREAU OF PLANT INDUSTRY

U. S. DEPARTMENT OF AGRICULTURE

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REPORT FOR THE MONTH OF DECEMBER, 1936.

HAVRE:

Precipitation in December amounted to 1.23 inches, with a total snowfall of 27.2 inches, the greatest snowfall in any winter month in 57 years of record, being exceeded only by 33.4 inches received during an early spring storm in May 1899. One unusual feature of the December snowfall was the fact that 18.3 inches, coming on the 4th, 5th, and 6th, evaporated nearly completely during a series of chinook winds, without run-off and with little or no mud. A second storm of 8.7 inches occurred later in the month, 6 inches of which is still on the ground. The mean temperature for December was 16.4°, a departure of 4.0° below normal. There were 11 days having minima of zero or lower and 14 days on which the thermometer reached 32° or above. The highest temperature was 51° on the 22nd and the lowest -29° on the 5th. Wind movement averaged 8.6 m.p.h., being somewhat above normal.

The year 1936 was characterized by wide climatic extremes. Total precipitation amounted to only 7.67 inches, the third lowest in 57 years. The past year had the coldest and warmest months on record, February having a mean temperature of -14.3°, and July a monthly mean of 79.7°. The absolute annual range was from 48° below zero to 106° above.

A variety of activities occupied the station staff and crew. Mild weather early in the month permitted the raking and burning of weeds in certain general farm fields. Other miscellaneous work such as repairing fences, building a stock pass at the main entrance, and hauling hay was accomplished. Owing to shortage of water in Beaver Creek, certain springs were developed to provide a supply for livestock. A WPA group have been engaged in remodeling a dwelling, and grubbing brush on bottom land where alfalfa is to be planted. Report writing occupied the attention of staff members during most of the month. Winter feeding experiments with cattle were begun on the 15th. The work in general is a continuation of projects already outlined, with the exception of two lots of cows, one of which is receiving Russian thistle hay and cottonseed cake, and the other Russian thistles and soybean oil meal cake.

Maximum temperature, 51°; minimum, -29°; precipitation, 1.23 inches.

JUDITH BASIN:

The month of December has been dry and open and has featured the most destructive soil blowing that has been experienced for several years. On December 11 the wind blew strongly throughout the day, and from that date until December 24 soil drifting was quite prevalent in all parts of the Judith Basin. Some stands of winter wheat have blown out beyond a chance of recovery, and other fields have been whipped and covered by the drifting soil until they appear quite black and devoid of growth.

Two periods of sub-zero temperatures were experienced; one on December 4 and 5 and the other from December 27 to 30. The minimum temperature of -22° was recorded on December 5.

Maximum temperature, 56°; minimum, -22°; precipitation, 0.19 inch.

HUNTLEY:

According to Weather Bureau reports the month of December, 1936, was, for Montana, the mildest in 40 years. Sub-zero temperatures and light snow storms were recorded locally early in the month and again during the close, but throughout the greater part of the period the days were clear and unseasonably warm. Livestock was given the run of fields, roadsides, farm pastures, and adjacent range lands most of the time; and, with the exception of cattle and lambs in the fattening yards, hay feeding was held to a minimum in order to conserve the limited supply. There have been a few windy days which are reported to have caused light soil drifting in some sections, but none has occurred to date on the station fields.

Winter wheat and rye look none too thrifty, although a large percentage of the fall stands appears to be alive on all station plantings. The grains were covered with snow during the coldest periods of the month and seemingly suffered little freezing, but continued exposure to sun and drying winds this time of the year has made them look dry. Crested wheatgrass has remained green during the month, although no new growth has been made.

Maximum temperature, 60°; minimum, -15°; precipitation, 0.27 inch.

SHERIDAN:

With the exception of short periods at the beginning and the end of the month, December was mild and pleasant. There were no extremes of temperature at any time. Some fall grain was sown in this section. Another seeding of crested wheatgrass was made on the station the 22nd. Fall seedings on the station still remain in apparently good condition, the one of late October not yet emerging. There was no snow cover of consequence during the month, and none at all most of the time. This condition, together with the mild weather, made a considerable saving on feed required for livestock.

Precipitation was about 3/4 the average for the month, a measurable amount being recorded 3 times, none of any consequence except to check evaporation for a short time.

Precipitation for the year was 9.64 inches, about an inch more than in 1919 and 1930. For the growing season, April 1 to August 31, it was the lightest yet recorded, 3.57 inches, and 0.57 inch less than in 1919.

Maximum temperature, 53°; minimum, -12°; precipitation, 0.36 inch.

DICKINSON:

Precipitation in December of 0.79 inch brought the total for 1936 up to 6.72 inches. A minimum temperature of -27° was recorded on December 7. The maximum for the month was 48°. About 6 inches of snow early in the month was nearly all gone from fields by the 25th. Light snow near the end of the month left about 3 inches on the ground at the end of the year. Heavy fog during 3 days left everything covered with heavy frost during the holidays.

Among the weather records made in 1936 are the following:

Lowest annual precipitation.....6.72 inches.
Lowest seasonal precipitation (4 months)
April-July.....2.03 inches.
Lowest absolute temperature..... -47°.
Lowest mean temperature for any month, Feb. -12.2°.
Longest cold spell, 42 consecutive nights with below zero readings; 15 days when maximum was not above zero.
Highest temperature of record.....114°.
Highest mean temperature for any month, July. 81°.
Highest evaporation (6mo. April--Sept..... 51.3 inches.

The drought of 1936 was the most severe of record. Practically all crops were complete failures. The grain harvested over a large area was not half of the amount seeded in the spring. About half of the livestock in this county was shipped out because of lack of feed, and to the southwest a smaller percentage of the stock was retained. The drought persisted in the fall, so that winter wheat and winter rye did not emerge, and the soil was as dry at the end of the year as a year earlier. Records show, however, that after other severe drought years a fair to normal crop was harvested.

MANDAN:

Arboriculture - The drought conditions during the latter half of 1935 and through all of 1936, gave all types of tree growth a very severe test. It is somewhat surprising that any species has been able to withstand the very limited amount of moisture, extreme heat, and high evaporation. With the exception of those trees that collected drifting snow last winter, it is doubtful if any appreciable amount of moisture has penetrated to the feeding root area since August 1935. How long trees can continue to survive under such conditions is difficult to predict at this time.

In the testing blocks on the Mandan station the following species had suffered only minor losses in stand, and no severe killing back at the end of the 1936 growing season: Siberian pea-tree, hackberry, Russian-olive, white ash, green ash, black ash, redcedar, engelman spruce, blue spruce, lodgepole pine, ponderosa pine, black poplar, chokecherry, buckthorn species, and American elm. Chinese elm and Douglas fir suffered heavy losses in stand for the first time. The Chinese elm attempted to leaf out in the spring but apparently died from lack of moisture after bursting of the buds. The Douglas fir suffered no losses until late summer, when the needles "browned" rapidly and 11 trees died. It may be of interest to note that this species, together with engelman spruce, were entirely devoid of green needles early in April 1936. All trees of both species recovered and put on new growth during the growing season.

In the farm plantings green ash and American elm have maintained average survivals of over 62 percent in the 20-year old plantings; in the 15-year old plantings species which have maintained good survivals are Russian-olive, Siberian pea-tree, green ash, chokecherry, and American elm. The average survivals vary from 60 percent for Russian-olive to 85 percent for Siberian pea-tree. The same species, except Russian-olive, and with the addition of Chinese elm, have maintained good survivals in 10-year old plantings; average survivals being as high as 90 percent for Siberian pea-tree. Survival of Russian olive dropped to 33 percent. Other species which were used in these plantings of the various ages have suffered heavy losses in stand. Redcedar, ponderosa pine, and blue spruce are the only coniferous species which have maintained fair survivals. A number of plantings of Black Hills spruce, Scotchpine, and jack pine, were a complete loss. Some of the trees had reached a height of 25 feet.

Average percentage survival of new plantings set out in 1936 were generally low and are as follows: Hackberry, 43.7; green ash, 41.2; Siberian pea-tree, 23.7; American elm, 18.5; Russian olive, 17.7; chokecherry, 15.2; honey locust, 14.7; and Chinese elm, 11.9. Average for all deciduous species 22.9 percent. Coniferous species were practically a complete failure, the average for all species being 2.4 percent.

The month of December seemed to be comparatively mild, but there were 12 days with minimum temperatures below zero compared to 9 in 1935. There was a cold period from the 4th to 10th, and again at the end of the month.

There was a high wind on the 19th, which averaged 30 miles per hour during most of the forenoon. The air was filled with dust during this time.

The snowfall during the month was 3.45 inches, and the precipitation was 0.24 inch. Most of the snow was very light and carried little moisture.

The total precipitation for the year was 6.43 inches, the lowest during 62 years of record for this area. The previous low was 8.13 inches in 1934.

Maximum temperature, 53°; minimum, -23°; precipitation, 0.24 inch.

ARCHER:

On the whole the weather during November and December was mild and dry. The maximum temperature during November was 65°, the minimum was 10°, and the precipitation was 0.13 inch. The maximum temperature during December was 57°, the minimum -6°, and the precipitation 0.40 inch. The seasonal precipitation during 1936 was 10.38 inches, and the annual precipitation was 12.32 inches.

Owing to the dry weather during the period September - December, the winter wheat is in poor condition, but the rye is in fair condition.

Livestock are in good condition, and feed is fairly plentiful, but a protracted period of severe weather would change the situation.

AKRON:

December produced two foggy periods which were very disagreeable. Otherwise the weather was agreeable for even outside field clean-up jobs. Considerable dirt was removed from the north line fence where it accumulated two years ago. The precipitation was very light, but there is apparently enough soil moisture to nourish the winter wheat through the winter, even if it continues to be dry. The snow that fell soon melted, and the ground has been bare during the month. Winter wheat passed the month apparently quite satisfactorily. Temperatures were low, but did not fall below zero until the 31st.

Maximum temperature, 62°; minimum, -4°; precipitation, 0.16 inch.

COLBY:

December was a dry and pleasant month. The temperature averaged about 4° above normal. There was very little wind, but three days were fairly windy with some soil blowing at times. There was no very bad weather. For several days at Christmas time the weather was very warm and pleasant. The precipitation was just about enough to keep the surface moist for wheat roots. Rabbits are fairly numerous.

Winter wheat made very little growth during the month. On only a few early planted fields has the wheat grown out of the drill ridges. Considerable pasturing is being done, even though growth is small, because of a shortage of other feed. The surface soil continues to be in good condition to blow and does blow when it is at all windy. At present it has a light covering of snow.

Maximum temperature, 64°; minimum, 4°; precipitation, 0.43 inch; snow, 4.4 inches; precipitation, 49-year average, 0.53 inch; precipitation, 1936, 10.92 inches; 49-year average, 17.50 inches.

GARDEN CITY:

Temperatures were considerably above normal for the month. Above normal temperatures, a high percentage of sunshine, and low wind velocities combined to make climatic conditions very pleasant. A slight amount of precipitation occurred on four different days during December and brought the total to slightly above normal for the month. Total precipitation for 1936 was but 13.01 inches, which is 4.58 inches below normal. There were no severe dust storms during the month, although neglected land is in excellent condition to drift badly during periods of high wind movement.

Wheat continued a slow growth throughout the month and is in good condition at this time. Reserve moisture is limited, however, and wheat will need additional moisture before time for rapid growth in the early spring.

Two hundred seventy head of range lambs weighing approximately 60 pounds were put into the feed lots on the State project on December 11. The lambs are divided into seven main lots and are being fed upon rations made up entirely of different sorghum grains and roughages plus cottonseed meal and limestone. The plan includes both dry lot feeding of sorghums and the lambing down of Wheatland milo, a combine type adapted to this area. The lambs are to be weighed every 15 days, and weights taken on Dec. 26 showed very satisfactory gains for the first period.

Maximum temperature, 64°; minimum, 10°; precipitation, 0.64 inch.

TUCUMCARI:

The month was very open and mild, with 18° the minimum temperature recorded, and with a mean temperature for the month 4° above the December normal. Wind movement was low until the last three days, when it was consistently high. Precipitation totaling 0.62 inch was received, bringing the annual total to 13.12 inches.

The first five months of 1936 were unusually windy. All winter and spring months except January were below normal in precipitation. July precipitation was unusually high, but of the total of 4.40 inches, 3.38 inches fell within a 5-hour period on July 11. August and early September were very dry, with severe injury to crops being evident some weeks before the showers of late September arrived. Considering all crops, station yields were but little over 50 percent of average.

1936 was above 1935, and far ahead of 1934, in precipitation. During the first 12 years after the establishment of the station, 1913-24, the average annual precipitation was 18.81 inches; the average over the past 12 years, 1925-36, is 14.40 inches. The past three years, 1934-36, show an average of 10.71 inches.

Acre Yields on Dry-land Project Plots, 1936.

Crop	No. plots	Average yield
Milo	44	15.2 bushels.
Kafir	18	10.7 bushels.
Cowpeas	9	1,780 pounds cured hay.
Corn	7	3.3 bushels (3 plots were failures)
Sorgo	5	348 pounds grain.
		5,092 pounds cured fodder.
Cotton	1	137 pounds lint.
Peanuts	1	920 pounds nuts.
Sudan grass	1	2,020 pounds cured hay.
Pinto beans	1	Failure.

DALHART:

A few snow flurries gave a total of 0.41 inch of precipitation for the month. Sufficient moisture was received to run some shallow furrows which would prove effectual for not more than one day's soil blowing. Only sufficient high winds were received during the month to start thistles to blowing. Soil blowing has not, as yet, been severe. Conditions are such that with a windy spring soil blowing could again reach alarming proportions in this vicinity.

In the past six months, since July 1, a total of 3.43 inches of precipitation has been received. This is the lowest for any similar period, and the year was the second driest on record. The total for the year was 9.93 inches. The average for the past four years has been 10.79 inches, which is approximately 60 percent of the 31-year average of 17.77 inches.

At the end of the month wheat was showing fair emergence on early fall plowed and fallow plots. This could not possibly survive if blowing is as severe as is indicated by the surface soil condition. Fall and winter moisture conditions have been good a relatively few miles to the northeast.

All crops on the station in 1936 were failures or near failures in all cases. An exceptionally interesting study was possible on the survival of blue-grama seedlings. This was gone into in the early fall and an interesting set of data accumulated, which seemed, at least as far as one year's results could do, to definitely indicate the factors which gave conditions favorable to survival. While the report would be too long to summarize here, the soil moisture factor was negligible insofar as it affected the survival of blue-grama seedlings as indicated by the area showing the highest survival of 97.5 percent of those plants which emerged. This area had less than 3 percent of soil moisture in the surface 6 inches, 3 percent in the surface foot, 4.8 percent in the second foot, and 5.2 percent in the third foot; these samples taken at the end of August.

Maximum temperature, 64°; minimum, 10°; precipitation, 0.41 inch.

BIG SPRING:

The month of December was unusually warm, with only a few days when the minimum was below freezing and even then it did not get below 24°. This warm weather together with ample soil moisture has provided very favorable conditions for early listing and plowing. Many farmers have taken advantage of this, and as a result there has been a much larger acreage prepared during December than in many years past.

Winter weeds in the pastures have made a good early growth, and as a result ranchers are taking their cattle through the winter in good shape with probably very little cost for supplementary feeds such as cottonseed cake. Wheat pastures have made a good early growth and are providing a large amount of grazing.

Station work has consisted chiefly of plowing and listing plots, plowing increase fields, and ginning cotton. It has also been necessary to cultivate many of the spring plowed plots because of the heavy winter weed growth. Other odd jobs has consisted of hauling forage sorghums from the plots, and hauling and grinding feed.

Maximum temperature, 69°; minimum, 24°; precipitation, 0.63 inch.

LAWTON:

The December precipitation of 0.67 inch from the 1st to the 5th and 0.83 inch from the 25th to the 29th, making a total of 1.50 inches, was very helpful to small grains, although the poor monthly distribution barely kept the topsoil moisture in fair condition.

Station plots of wheat, oats, and barley are in good winter condition. Growth has been vigorous but not rank. These crops on surrounding farms have been kept so closely grazed that they make but little showing at the present time.

Weather conditions have been very favorable throughout the month for farm operations, and a good deal of plowing and disking has been done on most farms.

The mean temperature of 43.5° in December was 4.5° above normal. The monthly minimum and maximum varied from 22° to 53° and 38° to 66° respectively. With the exception of cloudy, foggy weather December 1 to 5 and 25 to 29, clear skies and sunshine prevailed.

The annual precipitation of 22.15 inches in 1936 was 8.7 inches below the long-time average. The September precipitation of 10.12 inches was 45.7 percent of the yearly total. May, June, and September were the only months when the precipitation was normal or above.

WOODWARD:

The month of December was characterized by moderate temperatures, moderate wind velocity, and small scattering showers amounting in all to 0.86 inch. In the immediate vicinity of Woodward it is not felt there is any general danger of soil blowing. While the wheat has made too little top growth to afford much pasture, it is very healthy and will resist soil movement. Different people coming from various points over the Texas Panhandle report that "looking down the rows a good stand of wheat is evident, looking crosswise of the rows the fields seem bare". From evidence I get from travelers this condition prevails in Texas, Oklahoma, and Kansas west of the 100th Meridian to the ragged edge where wheat either was not planted or failed to come up.

Station work during the month consisted principally of threshing sorghums, cleaning seed, building grape trellis, hauling brush, digging and packing trees and repairing machinery.

Maximum temperature, 65°; minimum, 20°; precipitation, 0.86 inch.

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Sand Dunes in Oklahoma

E. F. Chilcott reported recently on a trip taken to Waynoka, Okla., about 50 miles from Woodward with Dr. Whitfield of the Soil Conservation Service who is working on the sand dune project at Dalhart.

The dunes at Waynoka start at the edge of the Cimarron River and work inland several miles. They run for 20 miles or more along the river and are very active. The particular group that really require attention cover an area perhaps three or four miles square. Those along the river threaten to start those nearer town and engulf both railroad and town. The front of them has not reached a creek along which cottonwoods 60 feet in height are growing. The wall of sand towers above them 30 ft. Back of this front is sand 10 to 60 ft. deep for 4 miles with hardly a vestige of vegetation on it. Some time in the distant past these dunes were active and covered cottonwoods. As the sand grew up around them they apparently put out new roots at intervals. Then the sand blew away and exposed these roots, killing the trees. The old trunks now stand there with a root whorl every 5 feet or so.

Santa Fe Ry. officials have been rather helplessly worried over the situation for years. It is probable the sand hills could be vegetated and held before they reach the railway or city, which will take a number of years. The situation is quite dramatic. Waynoka is a Santa Fe division point of 2,500 inhabitants.

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BELLE FOURCHE:

December was comparatively mild and dry. A number of light snows were received, but the precipitation was of little value, the total being about 25 percent of the average for December. There were periods of low temperatures during the first and last weeks of the month, but abnormally warm weather prevailed from December 12 to 24, and the mean temperature for the month was 3° above normal. Wind movement was relatively low. Moderately strong winds occurred on December 2, 4, and 5, and an exceptionally high wind prevailed on December 30, but there was only a small amount of soil blowing.

The condition of crops remained essentially the same as at the close of November. Daily minimum temperatures were too low during the mild weather to permit the resumption of growth, and fall grain has not emerged on any of the plots.

A total of 10.36 inches precipitation was received during the calendar year of 1936. This is approximately two-thirds the average annual of 16 inches. The precipitation for the growing season was 6.17 inches, which is 6.13 inches less than the average for the 6-month period. Both the seasonal and annual precipitation are third to the lowest of record at this station.

Maximum temperature, 61°; minimum, -15°; precipitation, 0.11 inch.

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